

Prepared by: mike@tbs-online.co.uk For: Gary

+(44)7718916946

Manchester Road, Rochdale

Quote #: 5818771

Valid until: 26th December 2024

mike@tbs-online.co.uk



Solar Energy System Proposal

Dear Gary,

Thank you for the opportunity to present your Solar Energy System Proposal.

Best Regards,

mike@tbs-online.co.uk

tbs



This proposal is no longer valid, please contact mike@tbs-online.co.uk (mike@tbs-online.co.uk) to get an updated proposal.

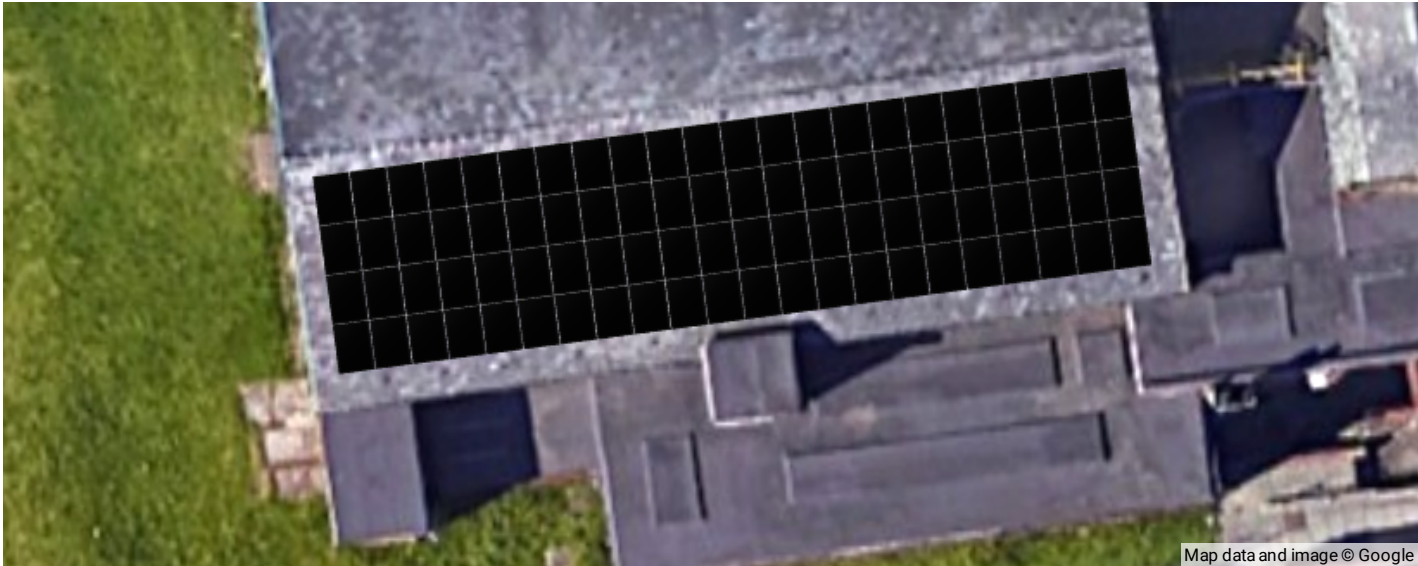
Recommended System Option

40.48_{kw}
System Size

£7,896
Estimated Annual
Electricity Bill Savings

£0
Total System Price

£0
Net System Price



Your Solution

Solar Panel

40.480kW of Solar Power
88 x AIKO-A460-MAH54Mb/2S
460 Watt panels
25 Year Product Warranty & **30 Year** Linear Performance Warranty
34,108kWh per year

Battery

SolaX Power
200.0 kWh Total Battery Storage
 1 x AELIO-P60B200 [BAT]

PV SOLAR CABLE 4.0MM BLACK - 25M REEL

PV SOLAR CABLE 4.0MM BLACK - 25M REEL
 6 x K4.0MM/BLACK/25

ZJBENY DC Isolator 1000V 32A 4P with MC4 Connector

ZNBENY BYH Series DC Isolator Switch in plastic enclosure is applied 1~20KW Residential or Commercial Photovoltaic system, placed between photovoltage modules and inverters. Arcing time less than 3ms, that keep solar system more safe. To ensure its stability and long service life, our products are made by components with optimum quality. Max voltage up to 1000V DC It holds a safe lead among similar products. Features IP66 , UV Resistance Arcing Time < 3ms Earth Terminal IEC60947-3, AS60947.32 Pole, 4 Poles Available (Single | Double String) DC-PV2 / DC-21B: 32A up to 1000VDC
 1 x BYH-32 W/ MC4 CONNECTOR

SOLAX AELIO-P60B200

60kW of Inverter Power
SolaX Power 1 x AELIO-P60B200



DC Isolator

Projoy Battery Isolator 160V 80A DC MCB
 1 x PEBS-L-125-80A-2P-DC

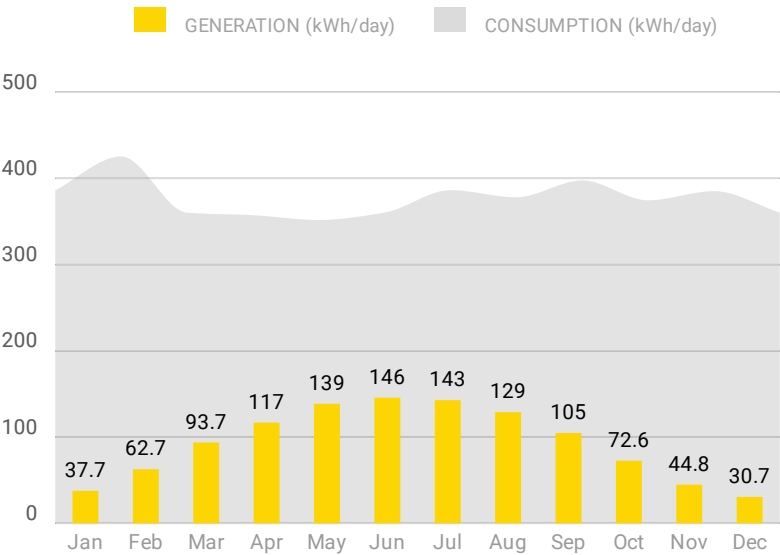
ZJBENY DC Isolator 1000V 32A 4P

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 5 x BYH-32

Warranties: 25 Year Panel Product Warranty, 30 Year Panel Performance Warranty

System Performance

25%
Energy From Solar



System Performance Assumptions: System Total losses: 0%, Inverter losses: 0%, Optimizer losses: 0%, Shading losses: 60.5%, Performance Adjustment: 0%, Output Calculator: MCS. Panel Orientations: 88 panels with Azimuth 172 and Slope 30.

The performance of solar PV systems is impossible to predict with certainty due to the variability in the amount of solar radiation (sunlight) from location to location and from year to year. This estimate is based upon the standard MCS procedure is given as guidance only. It should not be considered as a guarantee of performance. The solar PV self-consumption has been calculated in accordance with the most relevant methodology for your system. There are a number of external factors that can have a significant effect on the amount of energy that will be self-consumed.

Shading will be present on your system that will reduce its output to the factor stated. This factor was NOT calculated using the MCS shading methodology, but we can confirm that the system as quoted, taking into account the shading present, will deliver at least 90% of the energy (in kWh) as set out in this performance estimate.

This system performance calculation has been undertaken using estimated values for array orientation, inclination, or shading. Actual performance may be significantly lower or higher if the characteristics of the installed system vary from the estimated values.

Important Note: The energy performance and benefits of EESS is impossible to predict with certainty due to the numerous functions a system can be programmed to perform. This estimate is based upon the standard MCS proceduce and is given as guidance only. It should not be considered as a guarantee of performance.

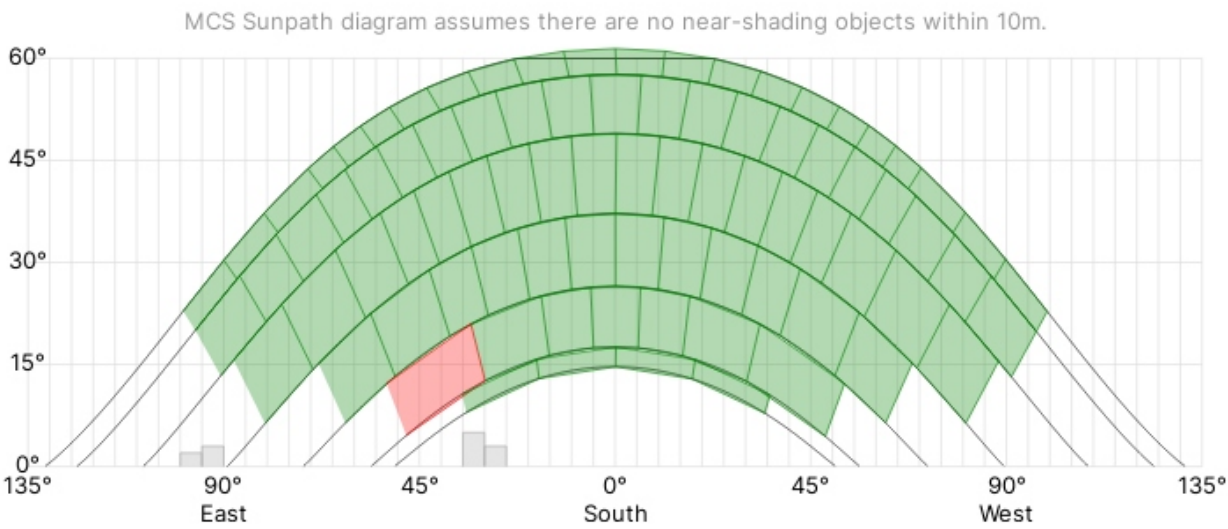
[EESS capacity not used for self consumption] Storage capacity of the battery - assumed usable capacity of battery [Total energy discharged per annum] Assumed usable capacity of battery x 730 [Additional self consumption] Estimated annual output (Section B) x self consumption rate with battery as a % (no higher than 95%) - Expected solar PV self-consumption (with EESS) (Section D)

A. Installation data		
Installed capacity of PV system - kWp (stc)	40.480	kWp
Orientation of the PV system - degrees from South	Group 1: 88 panels with Orientation: 10 °	°
Inclination of system - degrees from horizontal	Group 1: 88 panels with Tilt: 30°	°
Postcode region	7E	
B. Performance calculations		

kWh/kWp (Kk) from table	Group 1: 857	kWh/kWp
Shade Factor (SF)	0.395	
Estimated annual output (kWp x Kk x SF)	34,108	kWh
C. Estimated PV self-consumption - PV Only		
Assumed annual electricity consumption, kWh	137,436.00	kWh
Assumed annual electricity generation from solar PV system, kWh	34,108	kWh
Expected solar PV self-consumption (PV Only)	0.00	kWh
Grid electricity independence / Self-sufficiency (PV Only)	0.00	%
D. Estimated PV self-consumption - with EESS		
Assumed usable capacity of electricity energy storage device, which is used for self-consumption, kWh	180.00	kWh
Expected solar PV self-consumption (with EESS)	32,413.46	kWh
Grid electricity independence / Self-sufficiency (with EESS)	24.0%	%
E. Additional benefits from PV and EESS		
EESS capacity not used for self-consumption	20.00	kWh
Total energy discharged per annum	131400.00	kWh
Additional self-consumption for EV, heat pumps, diverters (only when present)	0.00	kWh

Sunpath Diagram

Disclaimer: The shade mask mapped onto the sunpath diagram is based off the field of view from a point in the center of the array. This means that the shade mask shown will only capture the shading experienced at the array center point, and will not reflect the shading casted onto other locations on the array.



Environmental Benefits

Solar has no emissions. It just silently generates pure, clean energy.



Each Year

25%

Of CO₂, SO_x & NO_x

9 tons

Avoided CO₂ per year

Over System Lifetime

259,410

Car km avoided

1,668

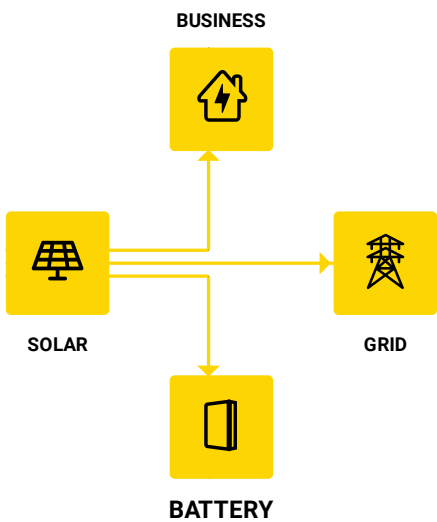
Trees planted

186

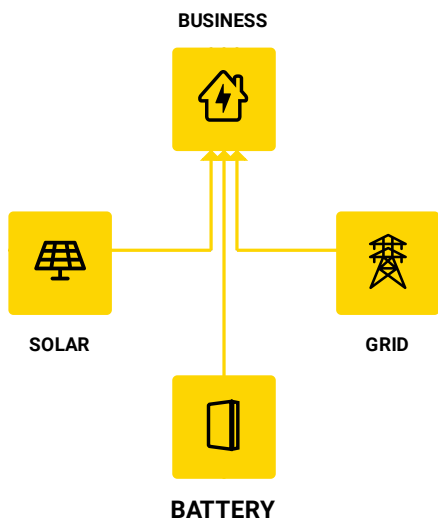
Long haul flights avoided

How your system works

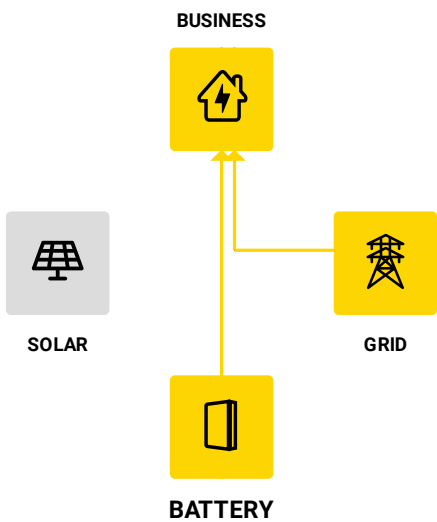
Generating Excess Solar



Partially Offset Usage

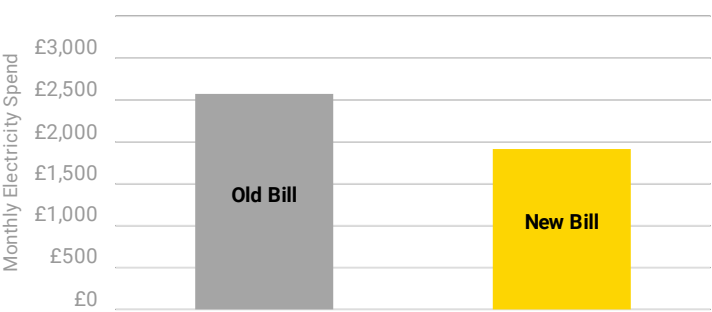


Night

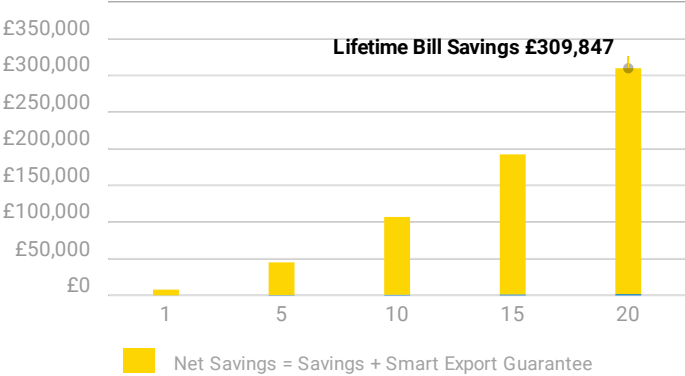


Electricity Bill Savings

First Year Monthly Bill Savings



Cumulative Bill Savings



Month	Solar Generation (kWh)	Electricity Consumption before solar (kWh)	Electricity Imported after solar (kWh)	Electricity Exported after solar (kWh)	Export Credit (£)	Utility Bill before solar (£)	Utility Bill after solar (£)	Estimated Savings (£)
Jan	1,169	11,969	10,800	0	0	2,688	2,407	281
Feb	1,756	11,911	10,155	0	0	2,672	2,249	423
Mar	2,905	11,165	8,330	73	4	2,509	1,821	688
Apr	3,503	10,719	7,493	253	14	2,409	1,616	793
May	4,295	10,903	6,992	368	20	2,451	1,486	965
Jun	4,368	10,810	6,838	362	19	2,429	1,447	983
Jul	4,427	11,977	7,899	326	17	2,690	1,684	1005
Aug	3,995	11,719	8,007	258	14	2,632	1,719	913
Sep	3,143	11,929	8,828	54	3	2,678	1,926	752
Oct	2,251	11,611	9,360	0	0	2,608	2,066	542
Nov	1,345	11,555	10,210	0	0	2,595	2,272	323
Dec	950	11,168	10,218	0	0	2,510	2,282	228

Your projected energy cost is calculated by considering a 7.0% increase in energy cost each year, due to trends in the raising cost of energy. This estimate is based on your selected preferences, current energy costs and the position and orientation of your roof to calculate the efficiency of the system. Projections are based on estimated usage of 137436 kWh per year, assuming British Gas Electricity Tariff.

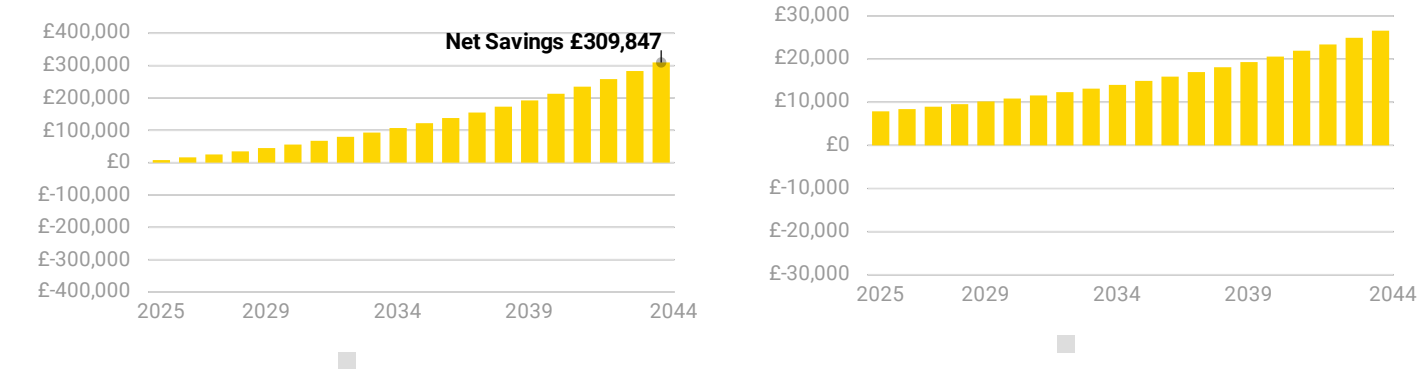
Your electricity tariff rates may change as a result of installing the system. You should contact your electricity retailer for further information.

Proposed Tariff Details - bg	
Energy Charges	
Consumption Charge - All Times <i>7am-12am Mon-Sun from 31 Dec to 30 Dec</i>	£0.23 / kWh
Consumption Charge - Night <i>12am-7am Mon-Sun from 31 Dec to 30 Dec</i>	£0.15 / kWh
CCL Charge	£0.01 / kWh

All Day Mon-Sun	
Smart Export Guarantee	
FiT All Day Mon-Sun	£0.05 / kWh
Fixed Charges	
Standing Charge	£0.95 / day

Cumulative Savings From Going Solar

Annual Savings From Going Solar



Estimates do not include replacement costs of equipment not covered by a warranty. Components may need replacement after their warranty period. Financial discount rate assumed: 6.75%

Quotation

Payment Option: Cash

88 x Aiko Energy 460 Watt Panels (AIKO-A460-MAH54Mb/2S) 1 x AELIO-P60B200 (SolaX Power) 1 x AELIO-P60B200 [BAT] (SolaX Power) 1 x PEBS-L-125-80A-2P-DC, 6 x K4.0MM/BLACK/25, 5 x BYH-32, 1 x BYH-32 W/ MC4 CONNECTOR	
Total System Price	£0.00 Excluding £0.00 VAT
Purchase Price	£0.00 Including £0.00 VAT

Price excludes Retailer Smart Meter should you want us to install your Smart Meter it will be an additional cost.
This proposal is valid until 26th December 2024.



This proposal has been prepared by tbs using tools from OpenSolar. Please visit www.opensolar.com/proposal-disclaimer for additional disclosures from OpenSolar.



ESS-AELIO

HYBRID C&I ESS CABINET

SolaX New Commercial Energy Storage Solutions



Robust

- Support both on-grid and off-grid operation
- Robust back-up ability, switch over time < 10ms, up to 150% EPS output for 10s
- Support unbalanced loads on three phases



Safe

- Four-level fire safety protection
- IP66 protection for Inverter and IP55 for cabinet
- AFCI optional
- AC&DC SPD type II, always guarding the inverter
- Smart IV Curve scan for early panel diagnosis



Intelligent

- AI ready, forecasting solar generation and load consumption, smart energy management strategy*
- Support smart scene function, intelligent loads management (e.g., Heat pump, EV charger)*
- VPP ready, SolaX cloud supports resource aggregator (2030.5, OpenADR)
- Support micro-grid and a variety of scenarios
- Support 7x24h remote O&M and schedule deployment
- Support wireless meter solution



Economic

- Maximum 200% PV oversized input
- Maximum 40A input current per MPPT, support high power solar panel
- Global MPP SCAN boost solar energy harvest
- Advanced LFP battery, single cabinet with up to 200kWh, expandable to MWh

* Under development

ESS-AELIO

“INTRODUCTION”

The ESS-AELIO (AELIO in short) series is a highly integrated, all-in-one hybrid energy storage cabinet designed for commercial and industrial (C&I) applications. It offers exceptional benefits such as intelligent charge and discharge management, enhanced safety and reliability, and simplified operation and maintenance.

The AELIO cabinet features high-density, high-safety, and high-performance LFP (Lithium Iron Phosphate) batteries. Available in two models with capacities of 100kWh and 200kWh, it ensures stable charging and discharging whether used as a single unit or in multiple cabinet configurations. The 280Ah large-capacity battery cells help reduce the system's initial cost.

Equipped with a self-developed Energy Management System (EMS), the cabinet can monitor the real-time status and issue alerts for each battery cell, PCS (Power Conversion System), and fire protection system. The EMS provides local data storage for up to one year, facilitating data analysis and verification. It also excels in smart operation strategies, autonomous scheduling based on local electricity prices, and comprehensive management of photovoltaic systems, energy storage, EV charging, and generators at the power plant level.

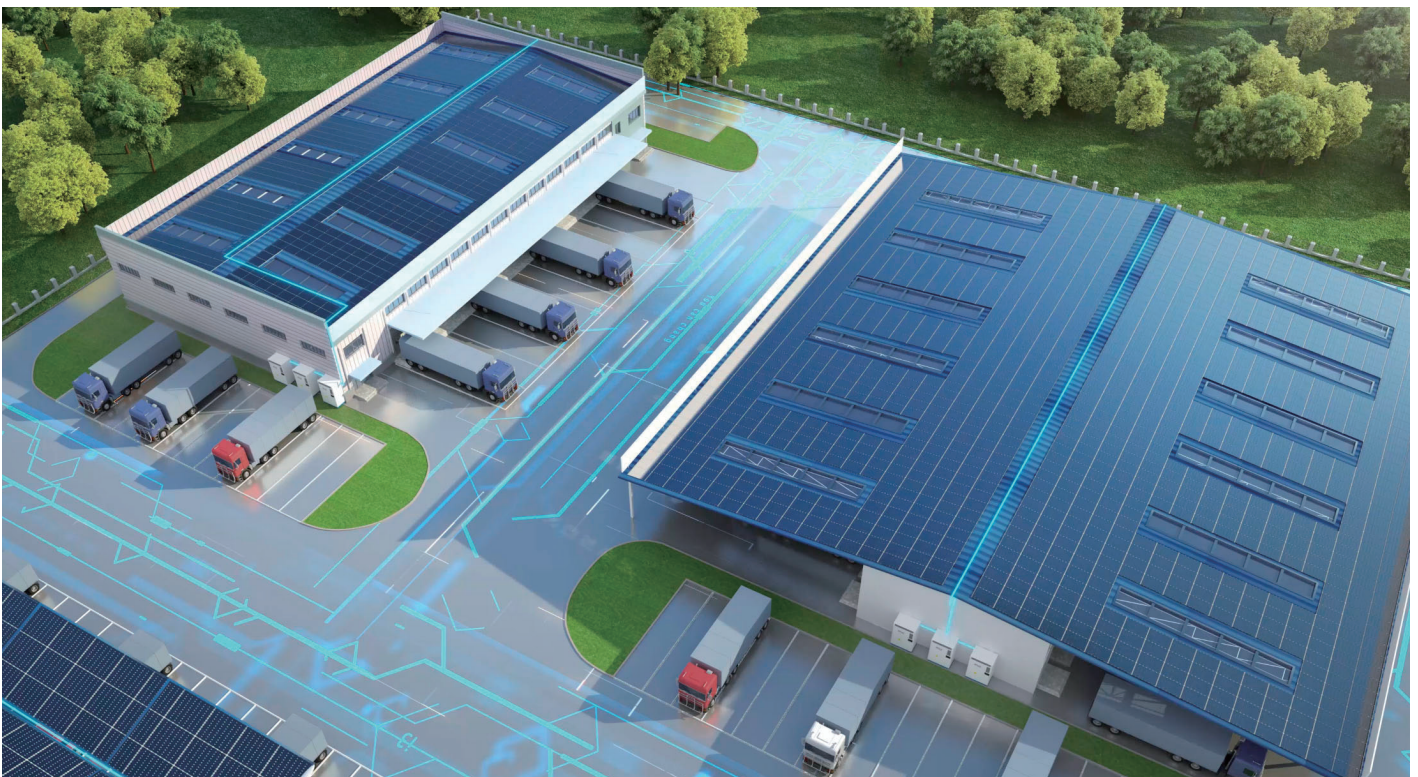


These features significantly enhance overall system efficiency and shorten the investment return period.

The cabinet incorporates multiple safety protection measures, including built-in functions to prevent overvoltage, overcurrent, and overheating. It is constructed with fireproof materials and a comprehensive Four-level fire protection system that quickly detects and responds to potential fire hazards, effectively controlling fire spread and minimizing safety risks.

Suitable for various C&I PV&ESS (Photovoltaic & Energy Storage System) scenarios, the AELIO cabinet supports peak shaving, demand control, backup power, diesel-generator backup, and stabilization of load consumption curves. Additionally, it is compatible with applications such as virtual power plants (VPP), peak regulation, and frequency regulation.

In summary, the AELIO series is an advanced energy storage solution that combines intelligent management, robust safety features, and versatile application support, making it an ideal choice for modern commercial and industrial energy needs.



AELIO-P50B100		AELIO-P50B200		AELIO-P60B100		AELIO-P60B200	
DC Side							
Max. recommended PV array power[kWp]	100			120			
Max. PV input voltage [V]①	1000						
Start-up voltage [V]	200						
Nominal PV input voltage [V]	650						
MPPT voltage range [V]②	160 ~ 950						
No. of MPP trackers / Strings per MPP tracker	5 / (2 per MPPT)			6 / (2 per MPPT)			
Max. input current per MPPT [A]	40						
Isc PV array Short Circuit Current per MPPT [A]③	50						
AC Side							
Rated output power [kW]	50			60			
Rated output current [A]	72.2			86.6			
Max. apparent power [kVA]	55			66			
Max. output continuous current [A]	83.6			100.3			
Nominal AC voltage [V]	3P4W, 400 / 230, 380 / 220						
Nominal AC frequency [Hz]	50 / 60						
Adjustable Power Factor range	1 (0.8 Leading ~ 0.8 Lagging)						
THDi (Rated power) [%]	< 3						
Battery Side							
Battery type	LFP / 280Ah						
Rated battery capacity [kWh]	100	200		100	200		
Rated battery voltage [V]	358.4	716.8		358.4	716.8		
Battery voltage range [V]	280 ~ 408.8	560 ~ 817.6		280 ~ 408.8	560 ~ 817.6		
Discharge depth [%]	90						
Rated charge/discharge current [A]	140						
Max charge/discharge current [A]	160 (80 × 2)						
General							
Dimensions(with Inverter) (W×H×D) [mm]	1310 × 2300 × 1140	2070 × 2420 × 1200		1310 × 2300 × 1140	2070 × 2420 × 1200		
Dimensions (without Inverter) (W×H×D) [mm]	1020 × 2300 × 1150	1680 × 2420 × 1200		1020 × 2300 × 1150	1680 × 2420 × 1200		
Weight (with Inverter) [kg]	1600	2800		1600	2800		
Weight (without Inverter) [kg]	1500	2700		1500	2700		
Operating ambient temperature range [°C]	-30 ~ 55						
Relative humidity(Non-condensing) [%]	0 ~ 95						
Max. operating altitude [m]	3000						
Cooling concept	Smart air cooling						
Ingress protection	Cabinet: IP55; Inverter: IP66						
Fire protection	Aerosol(Optional:Novec1230) / Water						
Topology	Non-isolated						
Standard	IIEC62619, IEC63056:2000, IEC61000, IEC62477-1, UN38.3						

① The maximum input voltage is the upper limit of the DC voltage. Any higher input DC voltage would probably damage inverter

② Input voltage exceeding the MPPT voltage range may triggers inverter protection

③ Isc current for single PV input string is 35A

HYBRID C&I ESS CABINET INVERTER



Safe

- IP66 protection level
- AC&DC SPD type II, always guarding the inverter
- AFCI optional
- Smart IV Curve scan for early panel diagnosis



Robust

- Robust back-up ability, switch over time < 10ms, up to 150% EPS output for 10s
- Support off-grid operation



Intelligent

- AI ready, forecasting solar generation and load consumption, smart energy management strategy*
- VPP ready, SolaX cloud supports resource aggregator (2030.5, OpenADR)
- Support smart scene function, intelligent loads management(e.g., Heat pump, EV charger)*
- Micro-grid ready, supporting a variety of scenarios, both on-grid and off-grid, balancing power between PCS and Hybrid in real time
- Support 7x24h scheduling mode
- Support Wireless meter solution
- Dual independent battery ports are ready to expand more capacity



Economic

- Maximum 200% PV input
- Maximum 40A input current per MPPT, support high power solar panel

* Under development

X3-AELIO-49.9K

X3-AELIO-50K

X3-AELIO-60K

X3-AELIO-61K

PV INPUT				
Max. recommended PV array power[kWp]	100		120	
Max. PV input voltage [V]①	1000			
Start-up voltage [V]	200			
Nominal PV input voltage [V]	650			
MPPT voltage range [V]②	160 - 950			
No. of MPP trackers / Strings per MPP tracker	5 / (2 per MPPT)		6 / (2 per MPPT)	
Max. input current per MPPT [A]	40			
Isc PV array Short Circuit Current per MPPT [A]③	50			
AC OUTPUT				
Rated output power [kW]	49.9	50	60	61
Max. apparent power [kVA]	49.9	55	66	66
Rated output current [A]	72.3	72.5	87.0	88.4
Max. output continuous current [A]	83.2	83.3	100.0	100.0
Nominal AC voltage [V]	3P4W, 400/230, 380/220			
Nominal AC frequency [Hz]	50 / 60			
Adjustable Power Factor range	1 (0.8 Leading ~ 0.8 Lagging)			
THDi (Rated power) [%]	< 3			

	X3-AELIO-49.9K	X3-AELIO-50K	X3-AELIO-60K	X3-AELIO-61K
Battery Side				
Battery type	Lithium - ion			
Battery voltage range [V]	180 - 820			
Max. charge / discharge current [A]	160 (80x2)			
Max. charge / discharge power [kW]	49.9 / 49.9	50 / 50	60 / 60	60 / 60
EPS OUTPUT (WITH BATTERY)				
Peak EPS output power [kVA]	55, long term / 75, 10s		66, long term / 90, 10s	
Rated EPS output voltage [V], frequency [Hz]	3P4W, 400/230V, 380/220V; 50/60Hz			
Rated EPS output power [kW]	49.9	50	60	61
Switchover time [ms]	< 10			
General				
Max. efficiency [%]	98			
European Efficiency [%]	97.2			
Ingress protection	IP66			
Operating ambient temperature range [°C]	- 35 ~ 60			
Max. operating altitude [m]	3000			
Relative humidity [%]	0~100			
Dimensions (WxHxD) [mm]	820x670x257			
Net weight [kg]	< 100		< 105	
Cooling concept	Smart air cooling			
Topology	Non-isolated			
Power consumption (night) [W]	< 10			
Over voltage Category Mains / Battery / PV	O.V.C III / O.V.C II / O.V.C II			
Display	LCD (optional)			
Protection				
Over/under voltage protection	Yes			
DC isolation protection	Yes			
DC reverse-polarity protection	Yes			
Grid monitoring	Yes			
DC injection monitoring	Yes			
Back feed current monitoring	Yes			
Residual current detection	Yes			
Anti-islanding protection	Yes			
Over temperature protection	Yes			
Surge protection (DC / AC)	Type II / Type II			
Arc-fault circuit interrupter(AFCI)	Optional			
Standard				
Safety	EN/IEC 62109-1/-2			
EMC	EN 61000-6-1/2/3/ 4, EN 61000-3-11/12, EN 55011, IEC 62920			
Cetification	VDE4105, G99, AS4777, EN50549, CEI 0-21, IEC61727, PEA/MEA, NRS-097-2-1, RD1699, TOR			

① The maximum input voltage is the upper limit of the DC voltage. Any higher input DC voltage would probably damage inverter

② Input voltage exceeding the MPPT voltage range may triggers inverter protection

③ Isc current for single PV input string is 35A

HYBRID C&I ESS CABINET PACK



TB-HR140

Battery type	LFP 280Ah
Battery capacity [kWh]	14.3
Battery Configuration	1P16S
Rated battery voltage [V]	51.2
Battery voltage range [V]	40-58.4
Weight [kg]	115
Charge / Discharge Rate	≤ 0.5C
Dimensions (WxHxD) [mm]	461 x 228 x 778
Operating temperature range [°C]	-20 ~ 53
Relative humidity (non-condensing) [%]	0 ~ 95
Max. operating altitude [m]	3000
Ingress protection	IP20
Communication to PCS	CAN



www.solaxpower.com

Global: +86 571-56260008
PL: +48 662 430 292

AU: +61 1300 476 529
DE: +49 (0) 6142 4091 664

UK: +44 2476 586998
NED: +31 (0) 8527 37932

info@solaxpower.com
service@solaxpower.com